CLAIMS:

What is claimed is:

1. A method for performing OTDM, said method comprising the following steps:

a) generating n bit streams of approximately B Gb/s from respectively n tunable laser beams having respectively wavelengths of λ1, λ2, ... and λn;

b) generating from said n bit streams n group velocity dispersed bit streams by introducing group velocity dispersion into said n bit streams;

c) combining said n group velocity dispersed bit streams into a composite bit stream of approximately nB Gb/s; and

d) in response to misalignment of bits within said composite bit stream, tuning said λ1, λ2, ... and λn to create the proper OTDM time differential between consecutive bits within said composite bit stream.

2. The method of Claim 1, further comprising the following steps:

e) generating a single-wavelength composite bit stream of approximately wavelength λv and nB Gb/s by operating on said composite bit stream with a wavelength converter; and

f) in response to misalignment of bits within said single-wavelength composite bit stream, tuning said λ1, λ2, ... and λn to create the proper OTDM time differential between consecutive bits within said single-wavelength composite bit stream.

3. An OTDM transmitter, comprising:

a) n channels of bit streams D1, D2, … and Dn having respectively wavelengths of λ1, λ2, … and λn, wherein for j = 1 to n, the j-th channel comprises:

j1) a tunable laser source Sj providing a bit stream Bj of approximately B Gb/s; and

j2) a group velocity dispersive element Ej coupled to said Sj, introducing group velocity dispersion into said Bj to generate said Dj;

b) a combiner coupled to said n channels and adapted to optically combine said D1, D2, …. and Dn into a composite bit stream of approximately nB Gb/s; and

c) a wavelength converter coupled to said combiner and adapted to convert said composite bit stream into a single-wavelength composite bit stream of approximately nB Gb/s to be transmitted through an optical link, wherein OTDM time differential can be created between consecutive bits of said single-wavelength composite bit stream by tuning λ1, λ2, … and λn.

4. A method for performing OTDM transmission, said method comprising the steps of:

a) generating n bit streams of approximately B Gb/s from respectively n tunable laser beams having respectively initial wavelengths of λ1, λ2, … and λn;

b) generating n group velocity dispersed bit streams by introducing group velocity dispersion into said n bit streams;

c) combining said n group velocity dispersed bit streams into a composite bit stream of approximately nB Gb/s;

d) generating a single-wavelength composite bit stream of wavelength λv by wavelength converting said composite bit stream with a wavelength converter;

e) in response to misalignment of bits within said single-wavelength composite bit stream, tuning said λ1, λ2, ... and λn to create the proper OTDM time differential between consecutive bits within said single-wavelength composite bit stream; and

f) transmitting said single-wavelength composite bit stream by launching said single-wavelength composite bit stream into an optical transmission link.

5. A WDM system, comprising:

a) m OTDM channels, wherein for k = 1 to m, the k-th OTDM channel comprises:

k1) n channels Vk1, Vk2, ... and Vkn providing respectively bit streams Dk1, Dk2, ... and Dkn having respectively wavelengths of λk1, λk2, ... and λkn, wherein for j = 1 to n, the j-th channel Vkj comprises:

kj1) a tunable laser source Skj providing a bit stream Bkj of approximately B Gb/s; and

kj2) a group velocity dispersive element Ekj coupled to said Skj, introducing group velocity dispersion into said Bkj to generate said Dkj;

k2) a combiner coupled to said n channels and adapted to optically combine said n bit streams into a composite bit stream Uk;

k3) a wavelength converter coupled to said combiner and adapted to convert said composite bit stream into a single-wavelength composite bit stream Ak of

wavelength λvk, wherein the proper OTDM time differential can be created between consecutive bits of said Ak by tuning $\lambda k1$, $\lambda k2$, … and λkn; and

b) a WDM multiplexer coupled to said m OTDM channels, with said WDM multiplexer adapted to generate a composite optical signal with a data rate of approximately mnB Gb/s.

6. An OTDM subsystem for performing optical time-division-multiplexing, said OTDM subsystem comprising:

a) n channels of bit streams D1, D2, … and Dn having respectively wavelengths of $\lambda 1$, $\lambda 2$, … and λn, wherein for j = 1 to n, the j-th channel comprises:

j1) a tunable laser source Sj providing a bit stream Bj of approximately B Gb/s; and

j2) a group velocity dispersive element Ej coupled to said Sj, introducing group velocity dispersion into said Bj to generate said Dj;

b) a combiner coupled to said N channels and adapted to optically combine said said D1, D2, …. and Dn into a composite bit stream of approximately nB Gb/s, wherein OTDM time differential can be created between consecutive bits of said composite bit stream by tuning $\lambda 1$, $\lambda 2$, … and λn.

7. The Claims of 2-6, wherein return-to-zero (RZ) format is used in generating bit streams.

8. The Claims of 2-6, wherein said B Gb/s is 10 Gb/s, and wherein said n is 4.

9. The Claims of 2-6, wherein said B Gb/s is 40 Gb/s, and wherein said n is 4.

10. The Claims of 2-5, wherein said wavelength converter is a vertical lasing semiconductor optical amplifier (VLSOA), and wherein said single wavelength is generated from the vertical lasing of said VLSOA.

11. The Claims of 2-5, wherein said wavelength converter uses four-wave mixing.

12. The Claims of 2-5, wherein said wavelength converter is a MZ-SOA.

13. The Claims of 2-5, wherein said wavelength converter is a SOA.

14. The method of Claim 1, wherein said n bit streams are generated by modulating respectively n CW tunable laser sources.

15. The method of Claim 1, wherein said n bit streams are generated respectively by n directly modulated tunable laser sources.

16. The OTDM transmitter of Claim 3, wherein for said j=1 to n, said Sj in said j-th channel is a CW tunable laser that is coupled to a modulator Mj, said Mj modulating a laser beam Lj generated by said Sj into said Bj.

17. The OTDM transmitter of Claim 3, wherein for said j=1 to n, said Sj in said j-th channel is a tunable laser that is directly modulated.

18. The method of Claim 4, wherein said n bit streams are generated by modulating respectively n CW tunable laser sources.

19. The method of Claim 4, wherein said n bit streams are generated respectively by n directly modulated tunable laser sources.

20. The WDM system of Claim 5, wherein for k=1 to m and j = 1 to n, said tunable laser source Skj in said j-th channel Vkj is a tunable CW laser source that is coupled to a modulator Mkj, said Mkj modulating a laser beam Lkj produced from said Skj into said stream Bkj.

21. The WDM system of Claim 5, wherein for k=1 to m and j = 1 to n, said tunable laser source Skj in said j-th channel Vkj is a tunable laser that is directly modulated.

22. The OTDM subsystem of Claim 6, wherein for said j=1 to n, said Sj in said j-th channel is a CW tunable laser that is coupled to a modulator Mj, said Mj modulating a laser beam Lj generated by said Sj into said Bj.

23. The OTDM subsystem of Claim 6, wherein for said j=1 to n, said Sj in said j-th channel is a tunable laser that is directly modulated.